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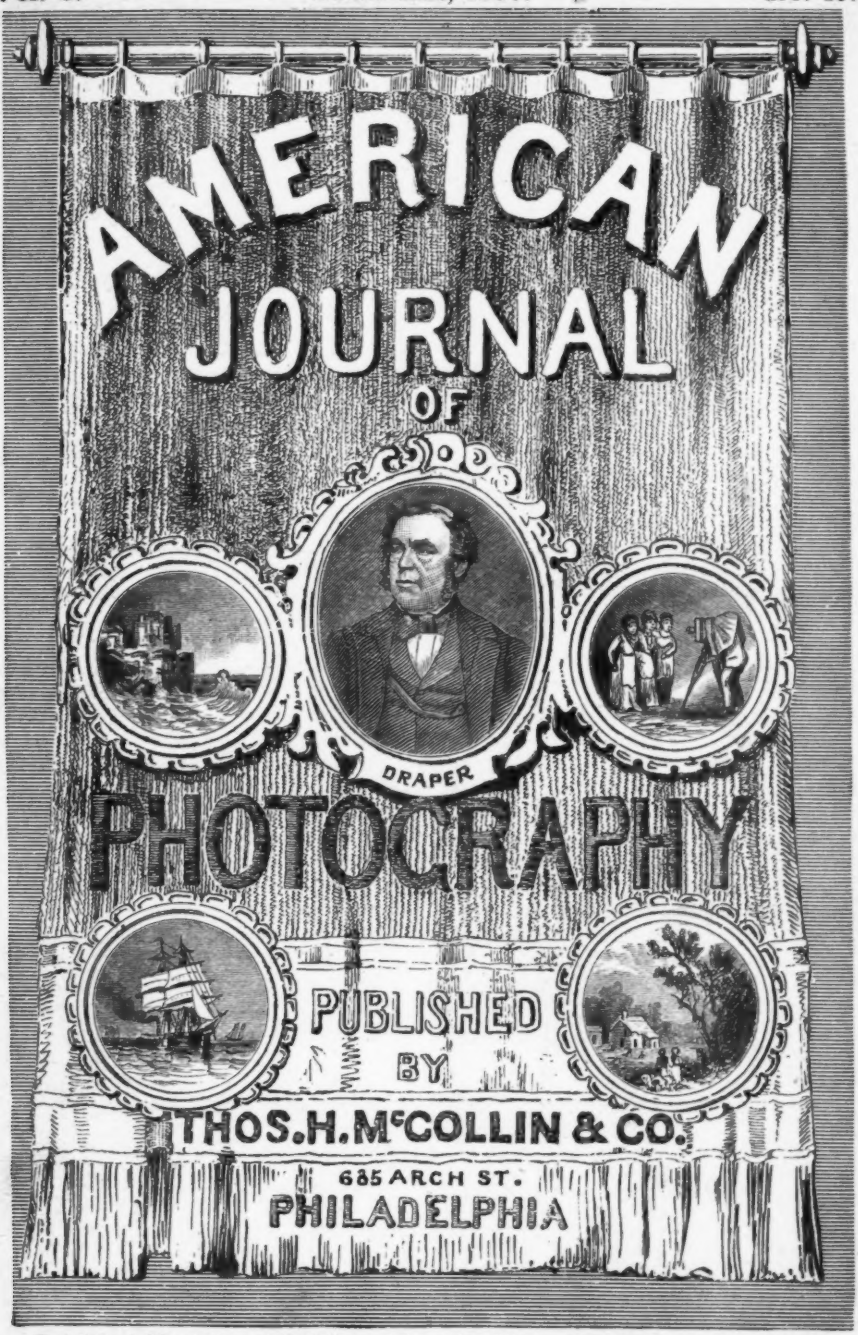

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AMERICAN

JOURNAL OF PHOTOGRAPHY.

Published by THOS. H. McCOLLIN & CO.

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AMERICAN
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Don't Ask Questions.

BY ELLERSLIE WALLACE.

A heading like the above may seem like anything rather than what ought to appear in a journal whose object it is to help and to inform those who read it. We let it stand as it is, however, in the hope that a somewhat numerous class of photographers who no sooner lose a few plates than they run to some one to ask questions why they have failed, may be induced to pause and think a little over their mishaps and the causes underlying them.

In order to produce good results in photography the various manipulations must be performed in a rational, orderly, and systematic manner, with good materials, and under circumstances as favorable as possible.

We may congratulate ourselves upon the fact that it is easier nowadays than it ever was before to make good photographs, but many people seem to take up the camera with the idea that it is nothing but a machine from which perfect photographs may be ground out somewhat as tunes are from a grind-organ. They soon realize their mistake, and then come floods of questions as to the reasons of their failures; sometimes the latter are amusing in their simplicity.

As an instance how highly educated persons will at times betray a singular want of common sense in these matters, we remember a gentleman of high scientific attainments who once came to us to know why the plate showed no image, but only a mass of fog. All the solutions had been "made of the finest chemicals, and in strict accordance with the printed formula." On examining into the case we found that he had been trying to work against the light. Having some models that he wished to photograph indoors, he had put them up in the window and going back into the room pointed the camera toward the subject, or, in other words directly against the glare of light entering in from the sky. He had also given an exposure so much too long that the feeble image impressed on the film was burnt out from over action. To cut the story short, we shall merely add that we gave our friend some elementary hints on the lighting and management of objects intended to be photographed, and, on leaving, asked him to remember that just as the human eye can not see the details of objects clearly when directed against the principal source of light, so neither can the lens and chemicals be expected to give a good picture under like circumstances.

Failures from careless handling of

chemicals are very common. We have been in dark rooms where the very air was filled not only with the fumes of volatile substances, but also with solid particles of hypo, iron, alum, common salt, bichloride of mercury, brass filings, etc. Any of these things if left on the floor are sure to get ground under foot, thus making a dust that rises and settles on everything. We have also been in dark rooms in the upper stories of high buildings where the heat in summer was so overpowering that the hydrant water would get warm on its way up through the pipes, and act injuriously upon the film. Again we have seen dark rooms so cold in winter that proper chemical action could hardly be said to take place at all; such operations as fixing (either plates or paper) being rendered most tedious and uncertain. Plates are sometimes lost by allowing white light to reach the film before fixing is thoroughly performed, and stains will often appear during intensification, even when the plates have been well washed. Too little light and too much light in the dark room are almost equally bad, for on the one hand we must be able to see clearly what bottles we are handling and what the character of the image is; and, on the other, the film must be amply protected against actinic light. Light-struck plates are seen every day; so are double outlines in the image, and want of sharpness from careless focussing; and we have even seen the view cut in pieces, as it were, by a badly chosen position of the camera, where branches of trees, ropes, cables, etc., passed right across the field of the lens. Even good operators will sometimes show landscapes in which the distance, projecting foliage against the sky, towers, church steeples, etc., are so badly solarized as hardly to be visible at all.

We speak of these apparently self-evident matters merely to give greater weight to our words when we say, that notwithstanding modern improvements in photography, there are great numbers of plates lost every day from causes that can only be attributed to want of forethought on the part of the operator. "I never thought of that" will account for many a wasted plate.

Bona-fide failures, if properly regarded, will often prove themselves the most certain and eloquent of teachers. We surely need not enlarge upon this. The prepared plates themselves are by no means always above suspicion. Even though they may be turned out perfect from the manufacturer's hands, something may happen afterwards. Where the plates are suspected, a few samples of *another make put through the same routine*, will often solve the difficulty. If this fail, an interchange of plates and solutions with some other operator not in trouble, will often indicate the sticking point. The saying that "two heads are better than one" is as true to-day as it ever was.

The Gallic Acid and Silver Nitrate Intensifier—Hydrochinon as an Intensifier.

JOHN G. CASSEBAUM.

READ BEFORE THE PHOTOGRAPHIC SOCIETY, OF PHILADELPHIA.

The best method of obtaining the proper density in a gelatine negative is undoubtedly proper exposure and development.

But even the best manipulators will sometimes be deceived in the printing qualities of a negative and I believe most all who have used the wet plate process have often longed for some intensifier like the old iron and silver, or pyro and silver, and no doubt many have tried o intensify gelatine negatives by the same method, but encountered the disagreeable foe, red stain, and abandoned its use.

Now I feel convinced from a number of experiments made, that iron, pyro or gallic acid and silver can be used without any danger of staining if the film is thoroughly washed and rendered slightly acid before attempting intensification.

If the plate is bathed in the iron and acid, pyro and acid or gallic acid and acid solution for a few minutes, and the solution then poured back into the graduate and the silver added and flowed back over the film, there will be very little danger of staining.

Nitric, acetic or citric acid can be used with either of the above reducing agents.

By this method a negative can be strengthened before fixing as well as after. In the first case the plate should be well freed from the developing solution, in the latter case thoroughly washed to remove all traces of hypo.

To intensify a negative before fixing can only be necessary, when handling plates extremely poor in silver as otherwise the desirable strength can be obtained in the development.

Now to come to the gallic acid and silver intensifying process published by Mr. Bartlett and Dr. Wallace, I must say that after many experiments in this direction, I have adopted the same, as it has proven the best of all in my hands.

By using the preliminary bath of

Per-chloride of iron,	4 gr.
Chrome-alum, - -	2 gr.
Citric acid, - -	4 gr.
Water, - - -	1 oz.

we have at once a clearer, an acidifier and a destroyer of the last traces of hypo.

The perchloride of iron (Mr. Bartlett's suggestion) has been added mainly for the last object and also to improve the resulting color of the negative.

In ordinary temperature double the amount of citric acid can be used and the alum dispensed with.

In extreme warm weather, and when dealing with plates inclined to frill or soften, it is best to pass them through an alum bath and to dry them before subjection to this process.

Attention should be paid not to carry the intensification too far, as the negative will gain intensity on drying.

The negative should not remain too long in the preliminary bath, so as to allow it to bleach, unless handling a negative slightly fogged or overdeveloped; in this case it is advisable to permit the plate to slightly bleach.

The dish containing the solution should be gently rocked to prevent a net marking, which otherwise is apt to occur.

After taking the negative out of this bath, it should be well washed for several minutes under the tap, and the gallic acid and silver, as per formula, flowed over it:

A

Gallic acid, 80 gr.; alcohol, 1 oz.

B

Silver, 40 gr.; water, 1 oz.

One drachm of each to 2 to 3 oz. of water.

When the negative has been allowed to bleach, intensification will have to be carried further, as the underlying image has been converted into a chloride of silver, and consequently would dissolve in the subsequent hypo solution. By carrying the intensification just to the right point, the negative, after leaving the hypo, will prove free of fog, and have brilliant lights and clear shadows.

Sometimes it will prove advantageous to flow the negative when taken out of the fixing bath, with the clearing solution.

It is needless to say that the plates should be well washed.

Recently I have made a few experiments with hydrochinon in place of gallic acid:

Hydrochinon, ...	60 gr.
Nitric acid, ...	2 drops.
Water, ...	6 oz.

½ oz. of this diluted with 2 oz. of

water, and 1 dr. of silver solution added. Plate also previously acidified.

The action of this intensifier is somewhat slower, but the resulting color of the negative is a rich black in the opaque parts, and even a plate, pyro stained to the color of a lemon, was converted into one of a rich gray after subjection to this intensifier. I believe hydrochinon and silver will prove an excellent intensifier and toner for window transparencies.

Killed by Overdose.*

BY J. F. RYDER.

THE uses and abuses of developing methods in general practice, is my subject. I give my impression and my opinion more as an observer than as a handler. I do not expect to tell you anything new, but may attract your attention to my impressions, in a manner to get some value, if any be in them.

The formation of the image in the negative plate and the positive paper are operations of such importance that we can hardly learn too much about them.

First let us consider the negative. You all know that pyro is the developing agent (I say pyro because it is almost universal in this country), and that the accelerator, whether it be ammonia, soda, or potash, is the power that sets the pyro at work. You understand that the pyro produces the intensity in lights or the white parts of your image, and that the accelerator takes care of the dark parts by working up the lower shadows, and giving detail and modeling through the lesser ones.

You all have your formulas, which you believe in. It is not my purpose to disapprove of any one, but to caution you to a careful use of all.

The exposed plate has an image in it; possibly the image is a landscape, some parts of which lie in full light, while other parts fall in deep shadow, or a clump of heavy dark foliage occupies the foreground—perhaps it is a room interior, which is dimly lighted, or the portrait of a person taken much in shadow. We are about to call that image into a palpable existence, to make a visible fact of it.

In case of either of the above described exposures shall we take the usual formula of proportion—so much No. 1 and so much No. 2, to so much water, as printed directions, to be found in every package of plates, say is proper? *Dare* we do it? I say no, if we care to find the best results. Now is just the time to go slow, the image can be better coaxed than driven. Take time, be patient, and get your reward. Understand you cannot get your density first and your details afterward, but *can* first get your details and afterward your density. It is always best first to lay the foundation and then erect the structure. Any builder will tell you that.

One of the most valuable elements of a developer is water, and it is too little used, or in other words, too little of it is used. Particularly for all plates of suspected under-exposure or of doubtful time, as well as for all large heads, a weak developer is required to start, and if found to want more strength add pyro.

Looking to the pyro for density and the accelerator for details, it is easy to understand by varying the proportions of these two elements, most any desired effect can be secured. The strong developer gives dense harsh results, while a weak developer gives soft and delicate effects, hence the value of more water. Remember the mild power is most effective for perfect results in developing. Don't give heroic treatment at the start in any case.

It often happens that at the close of a

*Read at the Chicago Convention.

day's work, with a big crop of negatives to develop, that the operator, anxious for supper, pushes the work too rapidly for safety. The next morning they are found coarse, harsh and smudgy. They were killed from overdose. If the proprietor have a care for the good name of his work, the sitters must be recalled and retaken. Too much haste often spoils what a little patience would have saved.

What I believe to be the best and safest method is to commence with the developer weak, and with the accelerator in excess of the pyro. As the development progresses and a want of more strength or density is discovered, pyro should be added to give it. To wear the same weight of clothing throughout the year, in cold and in hot weather alike, in a climate like ours, would be reckless and inhuman, but no more absurd than to give all plates the same strength of developer. No man can give a formula for all plates and all conditions, but by care and observation all men who develop plates may learn to adopt proportion and strength of solution to the plate's requirement.

Now a word about making the image in the albumen paper. All printers know that silver makes the print—too many of them think the more silver used the better the print. As a rule, when anything is found to be wrong, more silver is doused as a remedy. Where forty grains of silver to the ounce of water is recommended by the albumenizer of the paper, who knows the proportion of salt used, and bases the requirements of silver upon that knowledge, the usual printer requires sixty grains. Just enough chemicals for plate or paper is better than too much.

The tendency to overdose is prevalent, and the results are similar upon plate and paper alike. In both cases the overdose gives harsh effects, forms a crust upon the surface, preventing the gradual and perfect conversion through the film, clogs the shadows, and flattens the lights.

It is not unusual to see prints with the shadows and dark parts heavily loaded with a bronzed mass and sometimes even a green fog from overdose. Gold is always subject to the same abuse, being sometimes used so strong as to destroy rather than produce good tones.

A little more knowledge among operators and printers of paper, and necessary conditions for successful work in their departments of photography, and a careful observance of the requirements would greatly lessen the mortality list in plates and paper.

Instantaneous Photography With Magnesium.

Instantaneous photography by artificial light is the latest novelty. Messrs. Gädicke & Miethe, at one of the recent meeting of the Berlin Society for the Advancement of Photography, exhibited a process which excited much interest. They used magnesium, but instead of slowly burning the wire, employed the metal in the state of a powder, mixing it with salts evolving oxygen, such as chlorate and nitrate of potassa. The mixture produced an exceedingly brilliant white light, burning with such rapidity as to permit the photographing of moving objects. Instantaneous pictures were shown, produced by the process. The burning can be accomplished in $\frac{1}{10}$ of a second.

The inventors have produced a very complete arrangement for avoiding the fumes. The powder is burned in a lantern consisting of a strong case with a glass front; the case being impervious to the fumes, none escape.

The lighting of the shadows is effected by tin foil reflectors, and the light softened by interposition of tissue screens.

The advantages are:

1st. The portrait photographer is inde-

pendent of season or time of day, he has his light bottled up ready for use.

2d. With day light exposures in dull weather magnesium can be used to shorten the exposure and give a sparkle to the illumination.

3d. Portraits can be taken in ordinary dwelling rooms without skylight.

4th. Interiors can be better photographed by reason of the concentration of light.

5th. By the addition of sodium, lithium barium, etc., colors may be used in the reproduction of colored objects, paintings, etc. (Ortho-chromatic photography.)

Gelatino-Bromide Paper as a Basis for Finished Work.

G. HANMER CROUGHTEN.

(*Continued from page 152.*)

FINISHING IN WATER COLOR.

OF course in a paper like this I would not begin to give anything like an exhaustive set of directions for color finishing, so these remarks must be directed to those who know something about finishing in colors upon other surfaces. You will notice that in the two first methods of finishing I say nothing about preparing the surface of the paper, simply because there is no preparation required. For water colors the surface must be prepared by hardening the gelatine surface with alum. Without this hardening the surface is too receptive, the color being held when the brush just touches, and any attempt to blend or soften will result in pulling up the print from the surface of the paper; but after the application of the alum you can do anything with it. You can wash in or wash out, and even take out lights with water and rubbing with a cloth without raising the surface. The alum solution is 1 ounce powdered alum to 20 ounces of water. This is swabbed over the surface of the mounted print and left to dry, when it is ready for working upon.

Good effects upon vignetted prints can be obtained with very little expenditure of time by rubbing the background with colored pastel, the half hard kind, to which has been added just enough powdered pumice-stone to make the mixture feel gritty. Proceed exactly as described for crayon, You can rub one color over the other and so get effects of combined tints which are very pleasing. I set my palette for flesh painting with pink madder, vermilion, yellow ochre, cobalt blue, and the various browns for hair, etc. I just put a flat wash all over the flesh of a tint made by combining the pink madder with yellow ochre in different quantities according to the complexion, a dark complexion needing more yellow and a fair one more of the pink. Having put in my flesh washes, I next proceed to wash over the shadows with light washes of vermilion to kill the black of the prints. Next put in the carnations on the cheeks and lips; after this the face must be finished by hatching and stippling, the edges of all shadows being stippled with gray composed of cobalt and yellow ochre, the blue predominating on the forehead and upper part of the face, and the yellow on the lower part. All the usual methods of working water colors upon drawing paper or on any other photographic surface can be used on bromide paper after it has been prepared with the alum solution.

PASTEL.

There is no preparation of the surface needed for pastel. It takes hold of the surface as well as any other paper and can be worked by any of the usual methods. I like a good vigorous print with clean lights, and half tints and shadows not too black. I first lay in my dead coloring with soft French pastel, covering the photograph with the flesh tints as near

as possible with the proper strengths, lightening up the shadows with vermilion and yellow, then hatching with half hard and finishing with hard Swiss crayons. An effect of great finish is obtained by this method.

OIL.

For painting in oil upon a paper print, a sizing must be used to prevent the oil in the colors getting into and staining the paper, which it will do in spite of the gelatine. The sizing solution is 10 grains of gelatine to 1 ounce of water, brushed evenly over the print with a broad camel's hair brush. As with pastel so with oil. I prefer a good clear strong print, and work somewhat in the same manner, viz., from the shadows to the lights, painting over the photographic shadow with warm transparent colors and using opaque colors on lights, half lights and reflexes, finishing with solid color on the high lights and cool grays on the edges of the shadows.

A Search for a Substitute for Hypo.

BY ARTHUR H. ELLIOTT, PH.D., F.C.S.

(*Continued.*)

HAVING tried these experiments upon silver bromide, it was natural that the iodide also should receive some attention. Using the same quantity of silver solution, but precipitating it with potassium iodide in the same careful manner to avoid an excess of the alkaline haloid, washing and draining, there was obtained for each experiment 0.5725 gram (8.835 grains) of silver iodide.

Starting with the usual hyposulphite solution (1 in 6), it required 78 cubic centimeters (2¾ ounces) of it to give complete solution of the silver iodide (0.5725 gram). Hence one part of silver iodide requires 22.7 parts of hyposulphite for solution in a bath of 1 in 6.

Another bath of hyposulphite, twice as strong as that given above, was now tried, and it required 37 cubic centimeters (1⅓ ounces) of it to give a solution of the same quantity of silver iodide. Therefore one part of silver iodide requires 21.5 parts of hyposulphite for solution in a bath of 1 in 3. It would therefore appear that there is no economy in hyposulphite used in strong solutions when silver iodide is considered.

As in the case of silver bromide, ammonia solution has no perceptible solvent action upon silver iodide. However, a bath was made containing one-sixth hyposulphite and 4.87 per cent. of ammonia, and this was used as a solvent for the silver iodide. It required 67 cubic centimeters (2⅓ ounces) of this solution to dissolve 0.5725 gram (8.835 grains) of silver iodide. Then one part of silver iodide requires 19.4 parts of hyposulphite for solution in a bath of 1 in 6 containing 4.87 per cent. of ammonia. Here is a slight gain (about eleven per cent.) in the use of ammonia, and although not so great as in the case of silver bromide, yet under some circumstances it may be of advantage.

Ammonium acetate in a solution containing 50 per cent. of the salt, and slightly alkaline with ammonia, had no appreciable solvent action upon silver iodide. But when ammonium acetate is used in a solution containing one-sixth of hyposulphite and 15 per cent. of the acetate (slightly alkaline with ammonia), it required 68 cubic centimeters (about 2⅓ ounces) of the mixture to dissolve the above mentioned quantity of silver bromide (0.5725 gram=8.835 grains). This is practically the same result as that obtained by the addition of ammonia to the hyposulphite.

Two other compounds were tried upon silver iodide, for this appears to be the most insoluble of all the silver compounds with which the photographer has to deal,

and it would be a great boon if some better solvent than hyposulphite of sodium could be found for it. A solution of sodium sulphite was made containing 1 part of the salt in 4 of water; but it had no perceptible solvent action upon silver iodide, even with the addition of a little ammonia.

Ammonium sulphite in a solution containing 1 part of the salt in 3 of water, had no apparent solvent action upon silver iodide, addition of ammonia making no change. But on adding a solution of sodium hyposulphite (1 in 3) complete solution was obtained after adding 50 cubic centimeters, the mixture already containing fifty cubic centimeters of the ammonium sulphite solution. It requires therefore about thirty parts of hyposulphite in a solution 1 in 6, with about sixteen per cent. of ammonium sulphite, to dissolve one part of silver iodide.

There are a few practical results that can be drawn from these imperfect and incomplete experiments upon the solubility of silver haloids. In the first place there is the determination of the fact (already known in a general way) that silver iodide requires 7.8 times more hyposulphite for its solution than silver bromide in a bath of 1 in 6. Second, addition of ammonia to the fixing bath increases the solvent action of the hyposulphite so that nearly twice as much silver bromide and eleven per cent. more silver iodide are dissolved than when ammonia is absent. Third, that the addition of certain salts to the fixing bath decreases the solvent action of the hyposulphite independently of dilution. Fourth, that the action of the different salts in the fixing bath is materially different with the two haloids.

HERR WEINER has determined that there are 10,000,000,000 molecules in a square inch of a film of silver; a single molecule in thickness.

Hydrokinone as a Developer of Dry Plates.

PRESENTED AT THE CHICAGO CONVENTION BY C. E. VON SOTEN.

THE various possible, and alas, oftentimes also nearly impossible forms of developers which, from the first practical application of the gelatine dry plate process up to the present day, have from time to time been brought forward, would fill many a page of photographic literature, and upon the experimental photographer has devolved the task of learning from careful and practical tests the characteristic qualities of each individual formula; of determining the amount of advantage gained from applying the one or the other, simple or modified, to certain special purposes; and of deducing therefrom the relative value as to general or special usefulness of the many different mixtures and components. The work, though highly interesting, has been arduous and difficult. A golden kernel of wheat has been brought to light out of an abundance of worthless chaff, and too much praise cannot be bestowed upon such men as Captain Abney, Dr. Eder, Carey Lea, and many others, for the invaluable services which, through their untiring energy on the field of photo-chemical research, they have rendered to our beloved profession. Yet with all due appreciation of these scientific investigations and the many valuable discoveries to which they have led, it appears to me that no line of research in photographic chemistry has brought less tangible benefit to the practical photographer than the dry plate developers; ferrous oxalate and alkaline pyro, in more or less modified form, being to-day, as they were five years ago, the only reducing agents in practical use with more than ninety-five per cent. of all the photographers on the

globe. Here then seems to be a chance for the introduction of something comparatively new, and on that ground I hope to be pardoned—this being my first publicly committed offense in this direction—for bringing to the notice of this Convention a developing agent which, though photographic periodicals have once or twice mentioned it, and though its name, hydrokinone, is undoubtedly familiar to many, is actually so very little known, that a few words in its favor may perhaps tend to bring it into more general use, and eventually gain for it the appreciation which it so highly deserves. The chief reason for its present lack of popularity is probably its rather high price, but were its excellent qualities better known, I have no doubt that its apparent expensiveness would no longer deter photographers from engaging its valuable services, for in the end hydrokinone will prove just as cheap as pyro, and perhaps more so than ferrous oxalate.

Hydrokinone (C_6H_4,OH_2), a derivative of cinchonin, is an hydrocarbon of a composition similar to that of pyrogallic acid (C_6H_3,OH_3), and its proportions also bear a strong resemblance to those of this, our most important oxidizer. Its capacity as an oxygen absorber is even greater than that of pyro, the comparative energy of my normal developers being as nine to seven in favor of hydrokinone. But this affinity for oxygen is not as greedy as that of pyro, and its action is therefore less violent and under better control, and in this property of applying its great reducing force slowly, gradually, without unnecessary waste and without exhausting its strength from the outset, I find the chief advantage of hydrokinone over pyro. Its developing action, as said before, is necessarily slower, but on account of the great constancy of its reducing power, marvellously effective, every molecule of the exposed film, no matter how feeble the impact of light, having to submit in due time to its persistent and apparently untiring energy. Its keeping qualities too, whether in stock solution or mixed developer, are excellent. I have a case on record when with six ounces of developer, containing 36 grains of hydrokinone, I developed 5 x 8 plates, transparencies and line-work negatives, without any addition whatever, by merely slightly increasing the time in the camera, after which the mixture was bottled, and served as an excellent "starter" for several subsequent exposures. A patent rubber-stoppered beer bottle full of the stock solution, put up on January 5th and kept in a dark room at a temperature varying from 50 to 90 degrees F., is today almost colorless and as good as when freshly mixed. Hydrokinone is but sparingly soluble in cold water, fifteen grains per ounce being about a saturated solution, but this is amply sufficient for practical use.

Another excellent quality of hydrokinone is the beautiful tone of its deposit, a fine, velvety engraving black, and a magnificent clearness of shadows, which for transparencies, lantern slides and line-work negatives especially, is unequaled by any other developer of my acquaintance. Alum and restrainer are unnecessary. The addition of bromide changes the tone to a rich brown, but it should be made very cautiously, as the addition of a ten per cent. solution will exercise quite a perceptible retarding action and render the mixture rather unfit for future use. A few drops of a one per cent. solution of hypo will to some extent restore the energy of the developer, but such doctoring is, at the best, somewhat hazardous. My formula, which after much experimenting I have found after more than four years' practice to be thoroughly reliable and in every respect satisfactory, is as follows;

SOLUTION NO. 1.

Soda carbonate . . .	50 grains
Water	1 ounce

SOLUTION NO. 2.

Hydrokinone, . . .	12 grains
Soda sulphite . . .	60 "
Water	1 ounce

For use mix

No. 1	1 ounce
No. 2	2 ounces
Water	1 ounce

The water is added either warm or iced, according to the season, in order to give to the developer the proper temperature. The image will make its appearance rather slowly, on a properly exposed plate in about two or three minutes; but, once started, development will proceed rapidly and progressively to the attainment of the finest detail and any required density. The film will never become stained under the most protracted development, and, owing to the strong tanning action of the hydrokinone, frilling, even in warm solution, is exceedingly rare. The same conditions that govern pyro development with regard to intensity and detail, hold good in the case of this reducing agent, an increase of hydrokinone giving strength and dilution producing detail. The amount of alkali in the formula given above being already large, I do not favor an increase of it with a view of forcing up detail, my mode being to obtain the proper intensity first and then, if required, finishing up for fine detail in water made slightly alkaline with soda carbonate. The plate is, of course transferred to this without washing.

I hope that some of the fraternity may give this developer a thorough trial and succeed with it as well as I have done.

A NUMBER of new elements have recently been announced, some of which may be called into service in photography ere long.

The Origin and Technology of Photographic Chemicals.

BY FRANK H. ROSENGARTEN.

Sixth Paper.—Carbonate of Soda and Carbonate of Potash.

Of all the chemicals produced in the world the soda and potash salts take the greatest amount of the labor and capital and plant in the varied industries in chemical commerce. These salts are necessary in almost every branch of manufactures, directly or indirectly, and are consumed in enormous quantities. The great source for them is in salt and chloride of potash, as we said in the last number of this journal. Notwithstanding the use of tens of thousands of tons of soda and carbonate of soda and carbonate of potash in this country, until a very recent date, not a pound of these products was made in the United States! This may sound most strangely, knowing the enormous production of salt, but it is nevertheless true, owing to the higher cost of labor and everything involved in manufacturing in this country compared with Great Britain and the continent of Europe. Until a very recent period, all the carbonate and caustic sodas were made by a process discovered by Le Blanc in 1784. The first factory was established near Paris, in 1790, and since then immense works have been created in England, Scotland, Germany, Belgium and France, but none in the United States. The Le Blanc process consists in the decomposition of chloride of sodium by mixing with sulphuric acid, forming sulphate of soda and hydrochloric acid. The hydrochloric acid goes off in gaseous form, either to be utilized in making bleaching salt or in old times was wasted, the sulphate of soda is dried in large iron pans. To form the carbonate, this sulphate of soda is mixed with lime and charcoal and heated in great furnaces, at very high

temperature and worked very much like the method of blooming iron. When the conversion is complete the product is in great black cakes called "black cake," consisting of a mixture of carbonate of soda, sulphate of lime and possibly some unburned charcoal. To separate these, the black cake is washed thoroughly with water, which dissolves the carbonate of soda, leaves the sulphate of lime and charcoal residue. The solution is filtered off, concentrated in suitable vessels to the proper density and allowed to cool very slowly, to produce the beautiful clear white crystals we know as washing soda. These processes involve handling and re-handling the stuff so often and under such difficult surroundings, the labor is very arduous and dangerous, owing to the heat and the noxious gases and danger of burning from splashing of the soda.

Not long ago a process of manufacture was patented by Brunner and Moud, Belgian chemists, invented by Solvay, which gives almost chemical pure carbonate of soda, and which involves immensely less labor and difficulty. Practically, the process consists in mixing chloride of sodium and bi-carbonate of ammonia, under pressure in large vessels and under constant agitation. To do this, salt is dissolved in water, heated, and a stream of ammonia gas and a current of carbonic acid passed through until the proper amount is used to convert the soda into bi-carbonate and the ammonia into chloride. As bi-carbonate of soda is comparatively insoluble, at the proper time the agitation is stopped, and this salt settles to the bottom of the vessel, and is removed, washed and finished. The chloride of ammonia liquor is utilized to reproduce gaseous ammonia, to be used again, by mixing with lime. Thus the only product wasted is the chloride of calcium thus formed, while in the Le Blanc method the sulphuric acid is lost and the labor is ten-fold. Owing to this cause the former manufacturers of carbonate of soda have been almost destroyed, and a factory under the Brunner-Moud patents has been begun in this country. The bi-carbonate of soda as obtained above is thoroughly washed and then heated in great pans to a moderate temperature, whereby the excess of carbonic acid is driven off, and then the process is complete. Simple as this process may seem, it took many years to perfect, though now the patentees are earning great fortunes by their persistence. There is a very fine quality of bi-carbonate of soda made from a mineral which comes from Greenland, called "Kryolite," a fluoride of aluminium and sodium. This mineral is ground and then roasted with lime, forming fluoride of calcium, the alumina and soda forming a weak compound, which is easily decomposed into carbonate of soda and alumina.

In commerce, carbonate of soda comes in many forms—crystalline, granular, and powdered—and is consumed in glass-making, soap works, paper pulp manufacture, and innumerable other industries, including our own little photography! But we must close here, and tell a word or two about carbonate of potash. As we said before, it is either produced from plants or from a mineral, chloride of potassium by a method similar to that of the Le Blanc process, and comes in a white granular form, very soluble in water and with an alkaline reaction.

Hydroxylamine as a Developer.

Hydroxylamine is a comparatively new chemical compound, discovered among the products of the reduction of nitric acid by means of tin and hydrochloric acid.

Its wonderful reducing properties suggested its employment in photography. Dr. Eder has made use of it as a develo-

per, for calling forth the latent image upon bromide and chloride of silver.

Its extremely high price—nearly five dollars an ounce—has hitherto been the great drawback to its use, notwithstanding its powerful action.

Lately, a method has been found to produce it much cheaper, so that we hope soon to see its general employment.

Egli and Spiller recommend the following formula for developing Gelatinio-Bromide plates:

A

Chloride of Hydroxylamine, 1 part.
Alcohol, ... 15 "

B

Sal Soda, ... 1 part.
Water, ... 8 "

Developer for use consists of:

Water, ... 60 parts.
B, ... 5 "
A, ... 3.5 "

The color of the resulting negative is steel gray, similar to that of a wet plate developed with iron, and the printing qualities are excellent.

The developer keeps clear a long time, thus affording a great advantage over the easily discolored pyro developer.

Bromide of Potassium is used as a restrainer, and Citrate of Soda may be employed as a retarder.

Beautiful lantern slides and transparencies, may be made with the use of Hydroxylamine, as a *developer* of Chloride of Silver Gelatine plates.

According to Spiller, the following gives beautiful tones for transparencies upon chloride plates.

A

Chloride of Hydroxylamine, 15 parts.
Alcohol, ... 480 "

B

Carbonate of Potassa, . . . 6 "
Water, ... 8 "

C

Ammonia, ... 1 part.
Water, ... 8 "

The chloride plates are exposed for ten minutes before a gas burner at a distance of one foot, and developed in the following:

A, . 15 drops (measured minims).
B, . 40 " "
Water, 5 drachms.

David & Scolik, recommend for chloride positives:

Hydroxylamine Chloride, (1.15) 30 parts.
Carbonate of Potassa, 30 p. c. 4 "
Water, ... 30 "

The high lights remain pure, and the tone is beautiful.

Hydroxylamine will probably play an important part in the future developement of dry plates.

Hydrochinone in Connection with Pyro-Gallic Acid as a Developer.

Philadelphia, Oct. 7, 1887.

MR. JOHN BARTLETT,

Editor of the *American Journal of Photography*.

DEAR SIR:—Try the following and let me know what you think of it:

Hydrochinone . . . . . 1 gr.
Pyro . . . . . 2 grs.
Carbonate of Soda . . . . 6 grs.
" " Potassa . . . 2 grs.
Sulphite of Soda (Crystals) . 18 grs.
Water . . . . . 1 oz.

I believe the admixture of hydrochinone and pyro is a novelty, and that it will be of interest to your readers.

From what few experiments I have made I am led to believe that hydrochinone inparts some good qualities to the developer, giving the negative a warm, gray tone, with great clearness in the shadows. The developer will also remain clear considerably longer time than when pyro alone is used.

Sincerely Yours,

JOHN G. CASSEBAUM.

Acting upon Mr. Cassebaum's suggestion we made a developer of the proportions recommended in his formula, and

were delighted with the beautiful results. We obtained a brilliancy and richness in the high lights, with fine graduation of tone, and a remarkable clearness in the shadows. It may be necessary at times to increase the amount of pyro and hydrochinone to obtain more density.

Hydrochinone will be found to be a valuable addition to our Pyro developer, and we recommend its use to all who delight in producing beautiful negatives.

Some Remarks for the Successful Employment of Obernetter's Process for Converting a Transparent Positive into a Negative. (Making a Negative from a Negative Direct.)

Fr. Muller, of Munich, at a recent meeting of the Wanderversammlung at Stuttgart, gave the results of his experience with the late J. B. Obernetter's Transformation Process.

The negative which it is intended to enlarge is placed reversed in the frame of the enlarging camera; that is the film side turned away from the objective; the image is focussed to the required size upon the ground glass, and the plate exposed for a long time. The development is effected with ferrous oxalate, and continued until the positive image is distinctly visible upon the back of the plate. After thorough washing the plate is repeatedly flowed with chromic acid solution until the surface becomes quite white again, so that on looking through it no dark spots are visible, and only the dim outline of the expectant negative in view. After another thorough washing the plate is flowed over several times with a solution of ammonia, again washed and it is ready for the second exposure to white light for a few seconds. It is then reimmersed in the former used developer (ferrous oxalate).

When sufficient density is obtained it is fixed and washed in the usual way, and the shadows cleared up with dilute hydrochloric acid quickly poured over it and again it is well washed.

The most important features of the process is the selection of a suitable gelatine plate. It must be upon the best plate glass, the emulsion thin and uniform, and one poor in gelatine, inasmuch as an excess of gelatine greatly retards the process, and even prevents success.

The exposure is to continue so long that on development the image flashes up and the plate immediately blackens, and after two minutes the coloring penetrates to the back.

The chromic acid solution renders the plate insensible to white light, while the ammonia resensitizes it.

No notice is to be taken of a slight fog which appears on the second development, and which disapears with the clearing hydrochloric acid solution. It will not injure the brilliancy of the resulting negative in the least.

Some patience and experience is necessary to successfully perform the operation, but the labor is well bestowed in the results yielded, which are undoubtedly the most beautiful obtained by any enlarging process.

Fr. Muller employs the following solutions:

1. 1000 Water.
   200 Bi-Chromate of Potassa (in 500 parts hot water).
   1000 Nitric Acid (strongest), diluted with 15 parts water.
2. 1000 Water.
   20 Ammonia (strongest).
   20 Bromide Ammonium.

The Photographic Society of Philadelphia.

A stated meeting of the Society was held Wednesday evening, October 5th, 1887, with Vice President, John G. Bullock in the chair. The Committee on

Membership reported the election of Messrs. Edward P. Alexander and T. Bowman Price as active members; Mr. John G. Cassebaum, who was present by invitation, read a paper on the Gallic acid and silver intensifier as applied to gelatine plates. The paper was listened to with great interest, after which specimen plates intensified in this manner were shown and the process demonstrated by actual experiment; Vice President Bullock and other members who had tried the method spoke highly in its favor. Mr. Carbutt showed a number of prints made from over-exposed plates, originally so thin that mercurial intensification had failed to produce printing density. A further application of gallic acid and silver, resulted in great increase of density and excellent prints were thus obtained.

Dr. J. M. Jordan showed one of Cooper's enlarging lanterns and illustrated its use by making some enlargements with Anthony's bromide paper. The light (which is supplied by a kerosene lamp fitted with a "Duplex burner) passes through two condensing lens and thence through the negative. By means of a small portrait lens the image is projected against any perpendicular surface to which a piece of bromide paper may be attached. By means of the lantern shown, cabinet sized negatives could be enlarged life-size or over. A valuable feature of the apparatus was that by detaching the lamp, the camera portion could be adjusted in a window so as to use daylight as a source of illumination. When so arranged negatives as large as 8x10 could be enlarged from. The camera could be used for copying purposes, having extra long bellows and by further changes in the adjustment an excellent optical lantern was produced. The paper used by Dr. Jordan was much more rapid than most brands of bromide paper and it was claimed that equally good results could be obtained from negatives which varied greatly in density.

Mr. Wood stated that he had lately examined some film negatives made about a year ago and had found them covered with mould.

Mr. Walmsley thought the trouble was caused by neglect to coat the films on both sides with thin collodiom. This would keep out the moisture which probably caused the mould and was now recommended by the makers.

Mr. Bullock called attention to a defect which he had frequently noticed of late in plates of several different brands. Minute particles of chrome alum seemed to be present in the film producing dark spots in the negative, sometimes partially redissolving in the washing and causing a comet-like streak on the plate. He suggested that they were caused either by careless filtration or perhaps crystalization of the alum in the emulsion.

Mr. Carbutt thought the quantity used was to small for the latter suggestion to hold good.

Dr. Wallace called attention to an article in a recent German journal, which gave some new details of the Obernetter process for transforming a transparent positive into a negative. The positive must be greatly over-timed, and over-developed in ferrous-oxalate. After washing, a weak solution of chromic acid is applied, which is in turn washed off and a solution of ammonia applied, the sensitiveness to light being thereby restored. The plate is then exposed to white light for a few seconds and re-immersed in the ferrous-oxalate. The negative image now slowly appears and when sufficiently strong, the plate is fixed as usual. To succeed with this curious process, the plates must be coated with an emulsion that contains but little gelatine (gelatine-arm), and some practice is necessary before perfect results can be expected.

The great over-exposure, and thorough development following, are mentioned as important points.

Mr. W. D. H. Wilson showed one of Gray's new model vest cameras, made for taking four pictures on a plate, each 2 5-16 in diameter, a convenient size for making lantern slides by contact. The camera was provided with a circular case in which it could be carried and used as an ordinary detective camera, its shape and appearance being such as to attract but little attention.

Adjourned.

ROBERT S. REDFIELD,
Secretary.

Sensitometer Numbers.

SINCE the introduction of dry plates it has been desirable to have a standard measure of sensitiveness by which the plates can be graded, and several instruments and contrivances are used for this purpose.

The Warnerke sensitometer is used by many manufacturers, but as the Warnerke numbers do not give the sensitiveness of the plates in direct proportion to the numbers, I, and many other manufacturers, have chosen a system, taking a certain rapidity (of the old wet plate) as a unit, so that the time of exposure can be calculated more easily by the given numbers.

The advantages of knowing the sensitiveness of the plates when making the exposures is apparent, but so far there is no positive means of determining it accurately as there is no standard light which always remains the same, and, consequently, no two sensitometers exactly alike, and, therefore, all measurements can only be approximate, and never as exact as the weighing of groceries or measuring of dry goods can be done. As desirable as it might be, if a plate marked a certain number would always be of the same speed, it will always remain "a consummation devoutedly to be wished for."

The sensitometers used by different manufactures are not exactly alike, and besides this difficulty there are other important factors to be considered.

Firstly, there will sometimes be a slight difference in the sensitiveness of plates of one emulsion, as the emulsion may gain in rapidity while it is kept liquid before it is used up.

Secondly, It often happens that the plates grow more rapid after being kept a while, so that sometimes plates which were originally 20 sensitiveness will be 25 or 30 when tried again after a lapse of several months.

With all these facts in view the sensitometer numbers marked on the plates can never be relied upon as absolutely correct and nothing but an actual trial can give positive certainty as to the correct time of exposure they should have.

G. CRAMER.

ST. LOUIS, MO., OCT. 7th, 1887.

To the Fraternity.

The P. A. of A. has voted to Jex Bardwell, of Detroit, the sum of one hundred dollars, in consideration of his services to us all in connection with the defeat of the Bromide Patent and the Shaw Silver Saving Patent. All the older members of our profession will recollect the efforts of the holders of these patents to tax the fraternity many thousands of dollars, and the great annoyance caused thereby, and as Mr. Bardwell is now in old age and in need of assistance, it is but just and proper that something be done to appreciate his services to our craft. Our association has started the matter, and all photographers, members or non-members, should contribute something and make up a sum sufficiently large to place him above want in his old age.

I am ready to do my share, and suggest that all editors of photographic journals will assist to carry out this benevolent purpose by receiving contributions and receipt for them through their journals.

The cause is worthy, let us all lend a helping hand, and by speedy and united effort give that assistance which, coming promptly, is double effective.

Fraternally yours,

G. CRAMER, Pres. P. A. of A,

Contributions to this most worthy cause will be received by Thos. H. McCollin, acknowledged and forwarded to Mr. G. Cramer.

We hope the fraternity will show a measure of gratitude for Mr. Bardwell's great service by a generous response to the appeal.

THE recent improvements in the Blair camera make it one of the best products of American skill. It unites so many good qualities, is of such excellent workmanship and finish, and capable of so manifold uses, by means of its adjusters, extensions, etc., that we are not surprised that the company has been obliged to open a Western depot to supply the greatly increased demand. It is located in Chicago, 205 State street, and is under the management of Mr. E. Clay Blair, whose good business tact and genial disposition will insure many pleasant relations.

THE high endorsement which the gallic acid and nitrate of silver intensifier received from such practical photographers as Mr. John Carbutt, Dr. Wallace and others, of the Photographic Society of Philadelphia, should be sufficient warranty for its efficiency in building up weak gelatine negatives.

Mr. Carbutt exhibited a number of prints from negatives strengthened with the intensifier—we doubt if any one could distinguish them from perfectly developed plates.

Mr. Carbutt also exhibited several instantaneous pictures taken upon his orthochromatic plates, in which there was a rendering in beautiful gradation of those colors which on an ordinary plate are generally translated as an unmeaning smudge of black.

We had seen examples of excellent work upon Carbutt's orthochromatic plates, but never before instantaneous pictures.

RATHGEBER FUR DEN POSITIVOPROCESS AUF ALBUMINPAPIER, is the title of a work by Dr. E. A. Just, of Vienna, Austria.

The name of Dr. Just attached to a photographic book is evidence enough of its value without any further recommendation. But we cannot refrain from speaking of the present publication. It is one of the most comprehensive books on the subject we have seen, and the amount of valuable information it contains is astonishing. The formul given are full, and the methods of manipulation not only give the means for achieving success, but point out the errors which may occur, and the means of obviating and correcting them. No point in any process seems to have escaped the scrutiny of the author, who is evidently thoroughly acquainted with the practical working of the various methods.

AT a recent meeting of the Photographic Society of Philadelphia, Mr. F. T. Fassitt, one of the oldest members of the organization and a gentleman of extended experience in Photography, called attention to the singularly bad wording of a formula given in the *British Journal Almanac* for reducing over-intensity of negatives. The wording was as follows: "Dilute ordinary chloride of lime with half its bulk of water and immerse the negative." Mr. Fassitt complained

that this was quite impracticable, a slimy mess resulting, which was unfit to apply to any photographic plate, and very properly remarked that numerous formulæ and recipes as printed in our journals and text-books were worse than useless, owing to the careless and indefinite manner in which they were given.

The editor of the *British Journal* in a recent issue attempts to give Mr. Fassitt a rap over the knuckles by reminding him that the word "dilute" refers to liquids only, and that therefore the chloride of lime mentioned must be *liquid chloride of lime!!* Such a preparation is certainly unknown in this country, and on comparing notes with a veteran English photographer we find (just as we expected) that no such article is commonly used in England. This seems to us to be a very poor way to evade the matter on the part of the editor of the *British Journal*, and we will hint to our learned colleague that inasmuch as the *Almanac* is largely read here and in other countries besides England, it will be well both for him and for the publishers to see that such loosely worded formulæ are corrected before going to press, and put into a "tongue understanded of the people."

THE first annual exhibition of the Photographic Society of India, will be held in Calcutta early in January, 1888, and will continue for a period of about three weeks.

Medals will be awarded by judges to be appointed by the society.

Photographs need not be framed, but they must be mounted, and in the hands of the Secretaries before January 1st.

Carriage on exhibits must be prepaid, and full instructions given as to return or sale.

Photographs to which medals are awarded will become the property of the society, and the society reserves the right of ordering further copies to be printed for distribution among members before a medal is despatched. The extra copies ordered will be paid for at fair rates.

All exhibits to be forwarded to J. S. Gladstone and A. Flemming, Joint-Corresponding Secretaries Photographic Society of India, 8 Clive Street, Calcutta.

The following medals will be open for competition:

His Excellency the Viceroy of India's own special Medal and the Society's Gold Medal for the best photograph in the Exhibition.

A Silver Medal will be held at the disposal of the Judges.

We trust American photographers will avail themselves of this opportunity to make a fine exhibit of their work.

The inducements are great. The possession of the Viceroy's Medal as well as that of the Society, are indeed prizes well worth laboring for. Undoubedly the Exhibition will prove a great success. We have had the privilege of seeing some of the work of the amateurs of India, and we can assure you it ranks high for artistic qualities and technical excellence.

THE mount bears the same relation from an artistic point of view, to the photograph, as the frame to the painting.

No matter how beautiful in harmonies the work of the artist may be, it will not produce as favorable an impression unframed, as it would in an appropriate frame to isolate it from the surroundings.

And so the photograph, though perfect in detail, rich in gradations and beautiful in finish, must have a suitable mount for a setting to its virtues.

Taste of late years, has demanded an entire change in styles. The old-fashioned gingerbread and scroll-work, we are glad to say, have gone to feed oblivion, and very beautiful patterns and delicate shades have taken their place.

A recent visit to the extensive factory of the Philadelphia Card Manufacturing Company, at Lansdowne, Pa., gave us an opportunity to see the interesting manner in which the raw material is worked up into the perfect cardboard, ready for the photographer.

The amount of work necessary to produce the final result is surprising, and were it not for the ingenious machinery employed, we fear the cards would not be so cheaply furnished.

Enormous screw presses, working under tons pressure, compact the numerous laminæ of the paper into the hard solid card. These great sheets are rolled and pressed to secure a uniform hard surface; they are then ready for the coloring, which is effected also by machinery. Great care is required to secure uniform tints, and also to make the color perfectly waterproof, so as not to rub off when the dampened photograph is mounted upon it.

The cutting machines, which regulate the sizes, work with ease and regularity, and the machinery for beveling the edges, effects the work with the greatest nicety.

Finally the cards are gilded, embossed and printed in various designs.

BY the courtesy of the Scovill Manufacturing Co., of New York, we have received a copy of their recent publication, "Photographic Printing Methods," by Rev. W. H. Burbank.

This work is much more than a compilation, although the author modestly claims no more. Of necessity he has drawn from various sources, but the drafts have been so well digested that the matter is his own, and he has the faculty of conveying his ideas in a clear, concise and forcible manner. The ground covered is extensive—from blue prints to photo-ceramics. It contains a fine frontispiece by the Photogravure Co. of New York, and an exellent bromide print on the Eastman paper.

FÈNYKÈPÈSZETI LAPOK.—Those of our readers who understand the Hungarian language, will be pleased to know that we have just received a journal printed in that tongue and bearing the above title, which rendered into English would mean "Photographic Leaves." The contents of the present number are:

1. Photographic Æsthetics, by Dr. A. Sarffy.
2. Gelatine Emulsion for Amateurs.
3. Landscape Photography.
4. Origin and Development of the Dry Process.
5. Secrets of the older Photography.
6. Miscellaneous—Editorial Correspondence, Free Insertions, Notices, etc.

The journal is published by Francis Veress at Klausenburg, Hungary, and is very well made up. The present number contains a pretty skating scene on chloride emulsion paper.

DESPITE the beautiful examples of natural lighting accessible to photographers, the average American operator prefers the bizaare effect of violent illumination: that is to judge by the majority of the work at the Chicago Convention.

SHOULD any of our readers desire to communicate with the genial treasurer of the P. A. of A. they must remember that his present address is No. 923 Main street, rooms 5 and 6, Kansas City, Mo. Mr. G. M. Carlisle also sends us an interesting pamphlet descriptive of the rapid growth and prosperity of Kansas City.

Reducer for too Great Intensity in Gelatine Negatives.

Per-chloride of Iron	60 grains.
Citric acid	120 "
Chrome alum	40 "
Water	32 ounces.

Immerse the dense negative in above solution for a few minutes; then remove to solution of hypo and water, ordinary strength, and after a few seconds, note the degree of reduction. This reducer is very energetic, and if the plate is allowed to remain too long in the hypo, the image will entirely disappear. Wash thoroughly after removal from hypo.

OCTOBER BARGAIN LIST.

Accessories:

1—Papier Mache, Fire Place and Cabinet combined, fair condition, reduced to $4 00
1—Universal Position Chair, Crimson Terry; all Attachments except Baby Chair; good as new 30 00
—Spencer Head-rest 11 00
1—Drapery 4 00
1—Drapery 6 00
1—8x10 Osborne Interior, new, light left of sitter 16 00
1—Pharaoh Position Chair . . . 18 00
1—8x10 Eastman's Roll Holder, good as new 20 00
1—8x10 Hough's ground, light left of sitter 12 00
1—8x8 Seavey Ground, new, light right 15 00
1—10 in. Rotary Burnisher, . . 12 00
British Journal Almanacs for 1878 20
Photo Mosaics for 1883, ... 20
1—No. 72 Osborne bridge good as new, ... 8 00
1—8x10 Plain ground 4 50
1—Bryant rustic gate 4 00
1—Seavey balustrade 14 00
1—Queen Anne baby lounge . . 10 00
1—Rustic corner chair 6 00
1—8x10 Perfect camera stand . 6 00
1—Knickerbocker stand, with 14x17 top 12 00
1—8x10 Osborne's interior background, new, light left . . . 20 50
1—8x10 Seavey's interior background, new, light left . . . 20 00
1—8x8 interior background . . 15 00
1—8x10 Hough exterior ground. 16 00
1—4x8 Osborne's tide slip . . . 7 50
5x8 orange glass developing trays 35
Wood drop shutters 1 50
Negative boxes, odd sizes, each . 20
1—Adjustable arm Position Chair 12 00
1—Position Chair, rising back . 8 50
1—6-inch Burnisher 4 00
4¼x5¼ Beveled Edge Cards, per dozen 10
12—5x8 Flat Printing Frames, in good condition, each . . . 45
10—8x10 Flat Printing Frames, good condition, each . . . 57
1—14 in. Eureka Burnisher . . 20 00
1—Osborne style, new 4 50
1—4oz. Porcelain mortar and pestle 35
1—6 in. Porcelain mortar and pestle 50
1—W. I. A. Ruby lantern . . . 35
1—Hydrometer 40
2—4x5 Japan trays and plate lifter, lot 20
Pearl leads, the best retouching point in the market, each . 15
Interchangeable View Albums, 7x10, for 5x8 views, with removable leaves fastened by cord, each 1 35

Camera Boxes:

1—5x8 Tourist Outfit, including 5x8 Tourist Camera Box, 2 Daisy Plate Holders, 1 Extension Tripod, and 1 Canvas Carrying Case, very little used. Price, new, $40.50, will sell for 30 00
1—4x5 Anthony's View Camera and 2 holders, lens and tripod 11 50
1—6½x8½ camera, with ratchet bed, ground glass and wet holder 6 00
1—Half-size Ferrotype box, with four 1-9 size tubes 15 00
1—3¼x4¼ Bicycle Camera, holder and case 9 00
1—4x5 '76 outfit 15 00
1—10x12 Cone View Camera, Double Swing, new 52 80
1—11x14 New Haven Reversible Back Camera, Double Swing, new 44 00
1—14x17 New Haven Acme Portrait Camera, Single Swing, new 46 00
1—14x17 Double Swing Portrait Box 40 00
1 · ¼ size Camera, and wet holder 3 50
1 · ½ size Portrait Camera . . . 5 00

Lenses:

1—¼ size Darlot Gem Lens . . 3 00
1—Finder 3 25
1—Prosch Shutter, No. 2, Pneumatic release 10 00
1—Matched pair German Stereoscopic Lenses, in good order . 15 00
1—Matched pair imitation Dallmeyer Lenses, per pair . . 12 00
1—5x8 Dallmeyer View Lens . . 15 00
1—Woodward Condensing Lens. 10 00
1—4x4 Darlot Globe Lens . . . 25 00
1—4x4 " " " . . . 20 00
1—5x8 Abendroth wide angle view

lens	18 00
1—½ size L. W. Krantz Portrait Lens	12 50
1—½ size C. C. Harrison portrait lens	5 00
1—¼ size portrait lens	3 00
1—½ size Darlot quick acting Portrait Lens, central stops .	18 00
1—10x12 Dallmeyer Rapid Rect. Lens	50 00
1—No. 6, 17x20 Darlot wide-angle Hemispherical Lens	40 00
1—4x4 Voigtlander Portrait Lens.	25 00
1—Extra 4x4 Chapman Portrait Lens	20 00
1—8x10 E. A. View Lens . . .	5 00
2—18x20 Harrison View Lenses, each	20 00
1—5x8 Darlot View Lens . . .	2 00
1—4x5 Harrison & Schnitzer View Lens	2 00
1—Ross View Lens	5 00
1—H. Fitz Double View Lens, revolving stops	8 00
1 pair 4x5 Dallmeyer R. R. Lenses	30 00
1—5x8 R. O. Co. Lens, good as new	3 00
1 pair Waterbury Stereo Lenses .	4 00

WANTED—A Ferrotype Camera with 37 Lenses, to make 36 pictures on a 5x7 plate with one exposure.

Also a Ferrotype Camera with 18 Lenses, to make 18 pictures on 5x7 plate with one exposure. Address A. R. J., care of Thomas H. McCollin & Co., 635 Arch St., Phila., Pa.

WANTED—One-sixteenth size Gem-Tubes. T. H. McCOLLIN & Co., 635 Arch Street.

WANTED—A young man would like position under the light: gained his knowledge of the business at Gilbert & Bacon's, Phila. Address K., care Thos. H. McCollin & Co., 635 Arch St., Phila, Pa.

GET the new C. B.—Combined Permanent Intensifier and Reducer for Gelatine Plates.

THOS. H. McCOLLIN & Co.,
635 Arch street, Phila.

WANTED an Operator, one capable of managing a gallery; or a young man to learn the business. Apply Thos. H. McCollin & Co., 635 Arch St., Phila., Pa.

Our Illustration.

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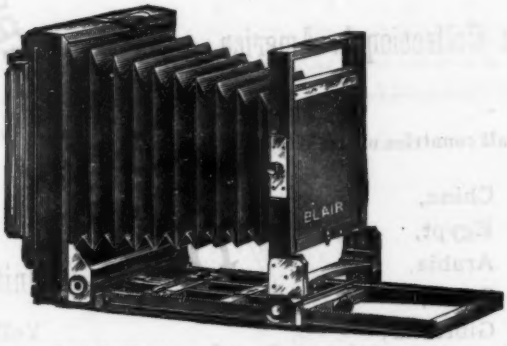

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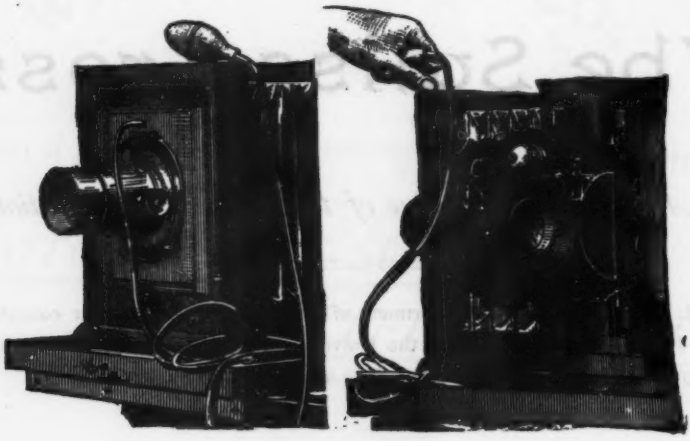

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